



Coastal Communications



COMPUTER AIDED TOMOGRAPHY USED TO DIAGNOSE HEALTH OF ESTUARIES



Background

Computer Aided Tomography (CAT) imaging, usually used by physicians to diagnose problems of human patients, is helping marine scientists at the National Health and Environmental Effects



Research Laboratory's Atlantic Ecology Division (AED), to evaluate the ecological health of animal communities living in coastal estuarine and marine sediments. This is the first time marine ecologists have used this technology to study environmental pollution problems, as reported in a recent article in the journal, *Ecological Applications*, [Volume 9(3); 1999; pp. 1050-1058].

Approach

Traditionally, sediment health is determined by collecting, identifying and counting these sediment dwelling organisms, but this procedure requires specialized training and is labor-intensive and time-consuming. CAT imaging offers a rapid, cost-effective alternative to this traditional method by quantifying the burrows and tunnels in sediment cores. Scientists first collect intact mud

cores from an estuary using cylindrical plastic tubes pushed into the sediment. The cores are tightly sealed at the top and bottom and transported to South County Hospital, Wakefield, Rhode Island, for CAT imaging (see figure above). Under a unique partnership and funding agreement with EPA, South County Hospital, located approximately seven miles from the AED (Narragansett, Rhode Island), has made its CAT scan imaging equipment available to EPA. The CAT imaging data are stored on a magnetic tape and subsequently analyzed on a personal computer at the AED. A three-dimensional image of burrows and tunnels within the core can then be reconstructed with these data (see figure to the right). In addition, these structures can be quantified and used to identify, monitor, and assess the effects of human activities on these sediment habitats. Because medical CAT imaging scanners are located throughout the world, this technique could be made widely available for environmental managers to evaluate the health of sediments.

Further Information

Ken Perez is the principal investigator for this study (email perez.kenneth@epa.gov; phone: 401-782-3052). Earl Davey is responsible for the technical work-up on the CAT data (email: davey.earl@epa.gov; phone: 401-782-3083). Lenour Durand is the Manager of the Diagnostic Imaging Department at South County Hospital in Wakefield, Rhode Island 02880 (phone: 401-782-8030). Visit the Coastal Communications web site at: <http://www.epa.gov/nheerl/whatsnew>.

